
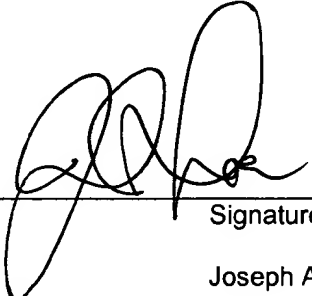


PRE-APPEAL BRIEF REQUEST FOR REVIEW		Docket Number (Optional)	
		Application Number	Filed
		09/936,818	February 28, 2002
		First Named Inventor	
		TAKAHASHI	
Art Unit		Examiner	
1722		M. SONG	
<p>Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.</p> <p>This request is being filed with a notice of appeal.</p> <p>The review is requested for the reason(s) stated on the attached sheet(s). Note: No more than five (5) pages may be provided.</p> <p>I am the</p> <p><input type="checkbox"/> Applicant/Inventor</p> <p><input type="checkbox"/> Assignee of record of the entire interest. See 37 C.F.R. § 3.71. Statement under 37 C.F.R. § 3.73(b) is enclosed. (Form PTO/SB/96)</p> <p><input checked="" type="checkbox"/> Attorney or agent of record <u>37,515</u> (Reg. No.)</p> <p><input type="checkbox"/> Attorney or agent acting under 37CFR 1.34. Registration number if acting under 37 C.F.R. § 1.34 _____</p> <p>NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.*</p> <p><input checked="" type="checkbox"/> *Total of 1 form/s are submitted.</p>			

  
\_\_\_\_\_  
Signature  
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Requester's telephone number  
June 20, 2006  
\_\_\_\_\_  
Date

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of

TAKAHASHI et al.

Atty. Ref.: 829-585; Confirmation No. 1578

Appl. No. 09/936,818

TC/A.U. 1722

Filed: February 28, 2002

Examiner: M. SONG

For: CRYSTAL GROWTH METHOD, PRODUCTION METHOD OF SEMICONDUCTOR  
MICROSTRUCTURE, SEMICONDUCTOR DEVICE AND SYSTEM

\* \* \* \* \*

June 20, 2006

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**PRE-APPEAL BRIEF REQUEST FOR REVIEW**

Pursuant to the OG Notice of July 12, 2005, applicant hereby requests a pre-appeal brief review of this case for at least the following reasons.

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**REMARKS**

Claims 29, 32-33 and 38-62 are currently pending. Only claim 29 is independent, as the other claims depend thereon either directly or indirectly. While applicant does not agree with the rejections of the dependent claims, this filing will focus on independent claim 29 in order to simplify the issues.

Claim 29 stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Jiang (US 5,956,364) in view of Tomomura (US 6,358,822; WO 98/44539). This Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 29 requires “a technique selected from among a molecular beam epitaxial (MBE) growth method, and a gas source molecular beam epitaxial (GS-MBE) growth method is used, supplying aluminum and ammonium (NH<sub>3</sub>) to a surface of the crystal so as to obtain a mixed crystal with a composition comprising nitrogen, wherein crystallization of the nitrogen from the ammonium which is supplied to the surface of the crystal into the surface of the crystal is accelerated by the aluminum supplied to the surface of the crystal, and wherein the substrate is at a temperature of 450 degrees C or more and less than 640 degrees C when the aluminum and ammonium are supplied in growing the III-V compound semiconductor that includes, as V group components, nitrogen and at least one of arsenic (As), phosphorous (P), and antimony (Sb).” The cited art fails to disclose or suggest these features of claim 29.

Jiang discloses a Vertical Cavity Surface Emitting Laser (VCSEL) with an integrated shaped cavity mirror. Moreover, Jiang discloses the use of molecular beam epitaxy (MBE) to form indium gallium arsenide aluminum nitride (InGaAsAlN) (e.g., col. 3, lines 13-26). However, Jiang fails to disclose or suggest simultaneously supplying ammonium (NH<sub>3</sub>) and aluminum (Al) to a surface of the crystal using a substrate temperature of from 450-640 degrees

C, such that crystallization of the nitrogen from the ammonium is accelerated by the Al, as required by claim 29.

Recognizing this fundamental flaw in Jiang, the Office Action cites to Tomomura. Tomomura discloses forming GaInNAs using a substrate temperature of 580 degrees C (col. 5, lines 53-55; col. 7, lines 30-41). Tomomura allegedly teaches that a temperature of 500-750 degrees C should be used when NH<sub>3</sub> is used as the nitrogen source (col. 7, lines 30-41). Since Tomomura teaches that a temperature of 500-750 degrees C should be used when NH<sub>3</sub> is used as the nitrogen source, the Examiner contends that it would have been obvious to have used NH<sub>3</sub> as a nitrogen source in Jiang and to have used the temperature of 500-750 degrees C as taught by Tomomura. However, this Section 103(a) rejection is incorrect for at least the following reasons.

While Tomomura teaches a substrate temperature of 500-750 degrees C when using NH<sub>3</sub> to form GaInNAs (col. 5, lines 47-57; col. 7, lines 30-41), Tomomura does *not* disclose or suggest using such temperatures when forming a layer with Al therein via MBE— which is a key point of the invention of claim 29. The instant inventors have surprisingly found that using temperatures from 450-640 degrees C during MBE is surprisingly beneficial when supplying NH<sub>3</sub> and Al at the same time in that crystallization of the nitrogen from the ammonium is accelerated by the Al at this temperature range. The cited art fails to disclose or suggest this unexpected phenomenon. Moreover, the unexpected results associated with this would rebut any alleged case or obviousness.

Tomomura's discussion at col. 15, lines 25-30, relied on by the Examiner, merely mentions As, P, Sb, Bi, B, Al, Ga and In in a laundry list of materials for a III-V compound. There is no discussion or suggestion by Tomomura in this respect of using temperatures from 450-640 degrees C during MBE when supplying NH<sub>3</sub> and Al at the same time so that

crystallization of the nitrogen from the ammonium is accelerated by the Al at this temperature range. This portion of Tomomura does not even say that ammonium is used, and certainly does not state or suggest supplying ammonium and Al at the same time, let alone at the claimed temperature range in a MBE process as called for in claim 29. There is simply no suggestion in the cited art for the invention of claim 29; hindsight is not permitted. No *prima facie* case of obviousness has been made.

Tomomura has only been found to disclose that “the substrate temperature in a range of 500 to 750 degrees C can be used when NH<sub>3</sub> is used as the nitrogen source” (col. 7, lines 30-41). However, in contrast, claim 29 specification requires that “wherein the substrate is at a temperature of 450 degrees C or more and less than 640 degrees C *when the aluminum and ammonium are applied* in growing the III-IV compound semiconductor . . .” Accordingly, Tomomura fails to disclose, teach or suggest setting a substrate temperature in a range of 450-640 degrees C “when the aluminum and ammonium are supplied” in growing the III-IV compound semiconductor as called for in claim 29.

The Office Action contends that Tomomura suggests supplying aluminum and nitrogen simultaneously, citing col. 15, lines 25-31 (see pg. 7 of the Office Action). However, although Tomomura may have included Al in a laundry list of Group III elements, this does not mean that Al and ammonium are supplied simultaneously as required by claim 29. There is no disclosure of suggestion in Tomomura of simultaneously supplying ammonium (NH<sub>3</sub>) and aluminum (Al) to a surface of the crystal using a substrate temperature of from 450-640 degrees. In this regard, the Office Action relies on impermissible hindsight.

In view of the above, it is respectfully submitted that the cited art fails to disclose or suggest the invention of claim 29. Thus, the Section 103(a) rejection should be withdrawn. All

TAKAHASHI et al.  
Appl. No. 09/936,818  
June 20, 2006

claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

**NIXON & VANDERHYTE P.C.**

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